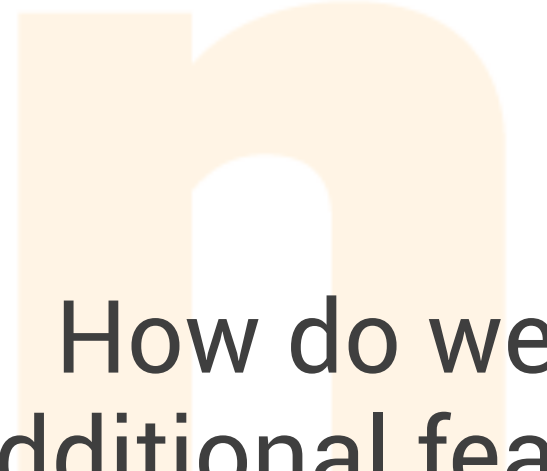




# Building and Distributing SDK Add-ons

Dave Smith  
NewCircle, Inc.

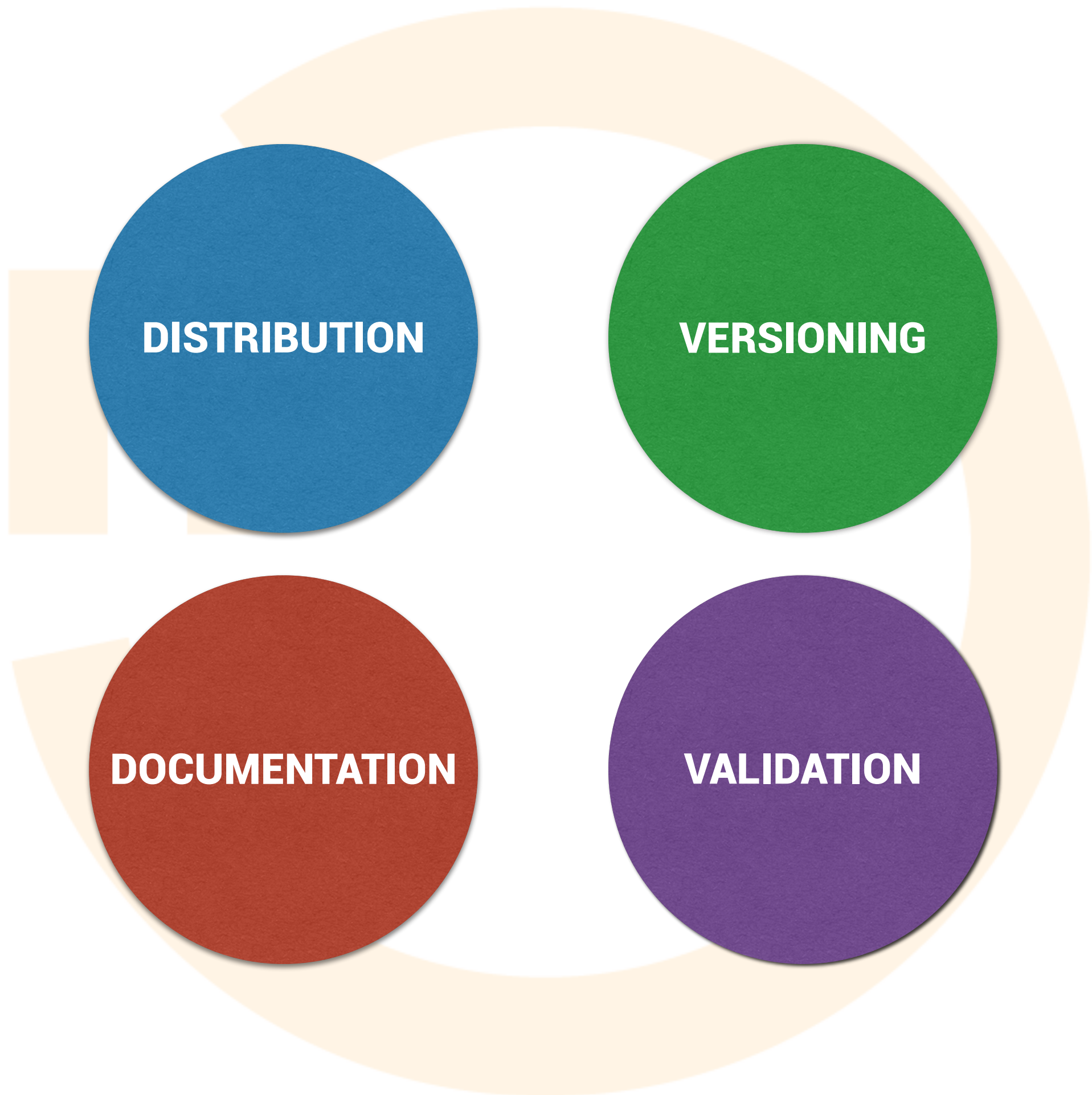
@devunwired  
+DaveSmithDev



How do we connect developers with the additional features and functionality we have built into our Android-based device?

–The Pointy Haired Boss





SDK Add-On

n



# SDK Add-On

## Library Package

Java stubs

Java docs

Meta

## System Image Package

System

Data

Ramdisk

Kernel

Meta



# SDK Add-On

SDK Repository

Repo XML Meta

Library Package

Java stubs

Java docs

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**SOLVED**



# Get The Tools!

platform/manifest/default.xml

```
<manifest>
  ...
  <project path="tools/adt/eclipse" name="platform/tools/adt/eclipse" groups="notdefault,tools" />
  <project path="tools/adt/idea" name="platform/tools/adt/idea" groups="notdefault,tools" />
  <project path="tools/base" name="platform/tools/base" groups="notdefault,tools" />
  ...
</manifest>
```

```
$ repo init -u https://android.googlesource.com/platform/manifest \
  -b android-5.0.1_r1 \
  -g all
```

```
$ repo sync
```

# Android Shared Libraries

- Exposed from the `/system/framework` for use by applications.
- Applications reference via `<uses-library>` in the `AndroidManifest.xml`
  - Library is appended to application's classpath
  - No copy necessary in application's APK
- Exposed via XML definition in `/system/etc/permissions`

**`/system/etc/permissions/com.example.library1.xml`**

```
<?xml version="1.0" encoding="utf-8"?>
<permissions>
  <library name="com.example.library1"
    file="/system/framework/com.example.library1.jar"/>
</permissions>
```

# Exposing Your Libs

## Android.mk

```
# Build the library
include $(CLEAR_VARS)
LOCAL_MODULE_TAGS := optional
LOCAL_MODULE := com.example.library1
LOCAL_SRC_FILES := $(call all-java-files-under,.)
include $(BUILD_JAVA_LIBRARY)

# Copy XML to /system/etc/permissions/
include $(CLEAR_VARS)
LOCAL_MODULE_TAGS := optional
LOCAL_MODULE := com.example.library1.xml
LOCAL_MODULE_CLASS := ETC
LOCAL_MODULE_PATH := $(TARGET_OUT_ETC)/permissions
LOCAL_SRC_FILES := $(LOCAL_MODULE)
include $(BUILD_PREBUILT)
```

# Documentation

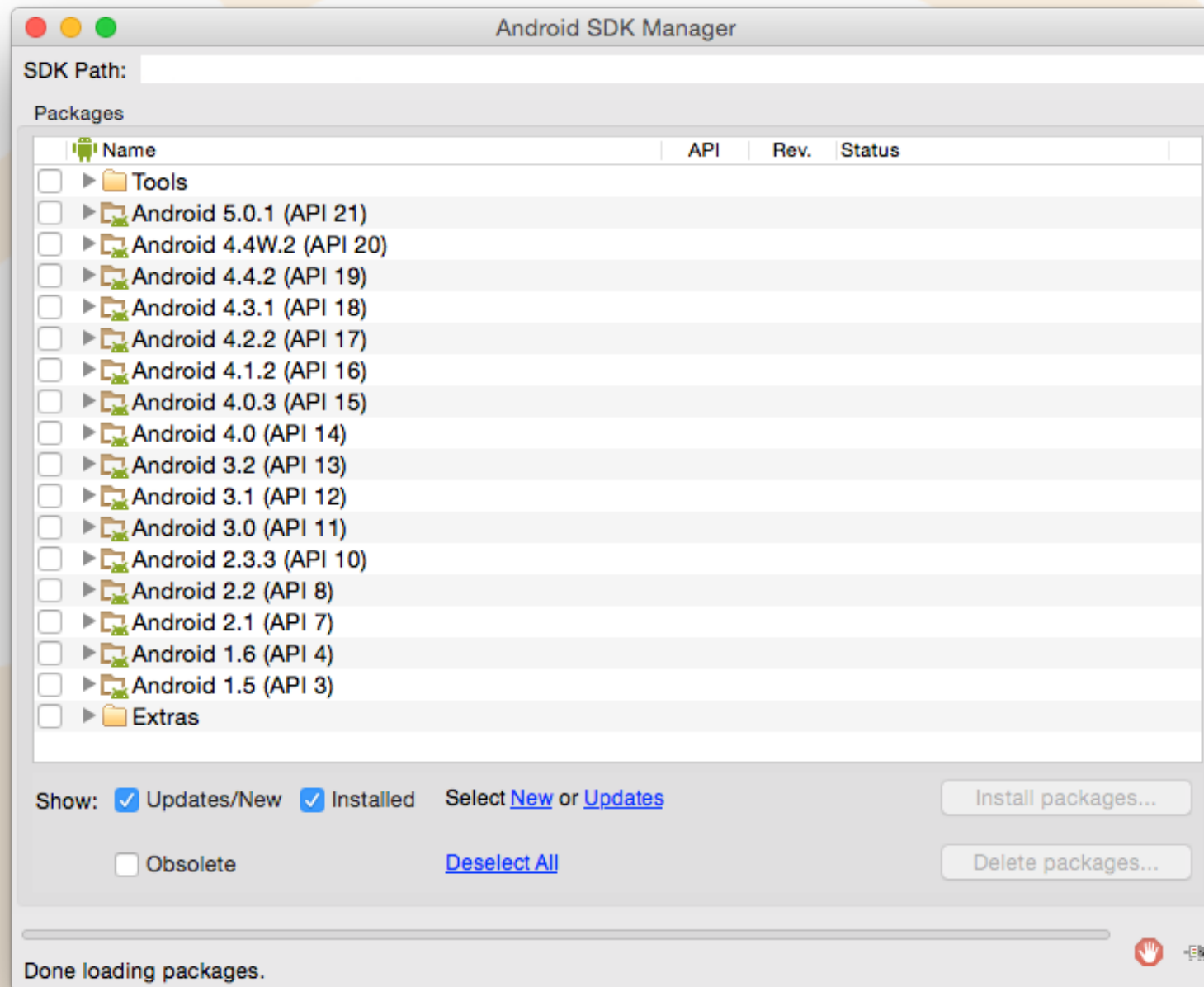
- Javadoc parser wrapper
  - Generated HTML from class/method comments
- Accessible to developers through the IDE
- Don't include in the system image packages list.

## **Android.mk**

```
# Build the documentation
include $(CLEAR_VARS)
LOCAL_SRC_FILES := $(call all-subdir-java-files) $(call all-subdir-html-files)
LOCAL_MODULE:= com.example.library1_doc
LOCAL_DROIDDOC_OPTIONS := com.example.library1
LOCAL_MODULE_CLASS := JAVA_LIBRARIES
LOCAL_DROIDDOC_USE_STANDARD_DOCLET := true
include $(BUILD_DROIDDOC)
```



# *Hook Into This...*



# *...Developers Understand This*

# Inform SDK Manager

## **manifest.ini**

```
#Identify the component  
name=SDK Add-On  
name-id=addon
```

```
#Identify yourself  
vendor=NewCircle  
vendor-id=newcircle
```

```
#Identify the base target  
api=21
```

```
#What did you add?  
libraries=com.example.library1;com.example.library2  
com.example.library1=com.example.library1.jar;Example Library  
com.example.library2=com.example.library2.jar;Example Service
```

# Stubs!

SDK Package

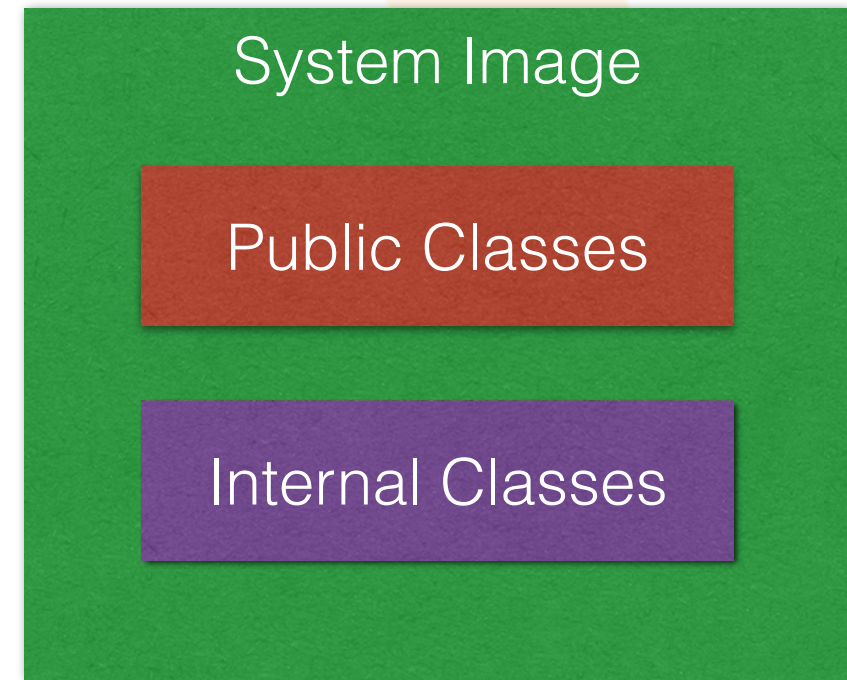


System Image

Public Classes

Internal Classes

# Stubs!



## **addon\_stub\_defs.txt**

```
+com.example.library1.*  
-com.example.library1.internal.*  
+com.example.library2.*  
-com.example.library2.internal.*
```



# System Image Metadata

## **source.prop\_template**

```
Addon.VendorDisplay=NewCircle
Addon.VendorId=newcircle

AndroidVersion.ApiLevel=${PLATFORM_SDK_VERSION}
Pkg.Desc=NewCircle SDK Platform ${PLATFORM_VERSION}
Pkg.Revision=1
SystemImage.Abi=${TARGET_CPU_ABI}

#Link this image to your add-on via the tag
SystemImage.TagDisplay=SDK Add-On
SystemImage.TagId=addon
```

## **device\_sdk\_addon.mk**

```
PRODUCT_PACKAGES += ...

PRODUCT_SDK_ADDON_NAME := device_sdk_addon

PRODUCT_SDK_ADDON_COPY_FILES := manifest.ini:manifest.ini

# Use this to copy your library modules
PRODUCT_SDK_ADDON_COPY_MODULES := \
    com.example.library1:libs/com.example.library1.jar \
    com.example.library2:libs/com.example.library2.jar

PRODUCT_SDK_ADDON_STUB_DEFS := addon_stub_defs.txt

# New on Lollipop+, system images are built as a separate package
PRODUCT_SDK_ADDON_SYS_IMG_SOURCE_PROP := source.prop_template

PRODUCT_SDK_ADDON_DOC_MODULES := com.example.library1_doc

# This add-on extends the default sdk product.
$(call inherit-product, $(SRC_TARGET_DIR)/product/sdk.mk)

PRODUCT_NAME := device_sdk_addon
PRODUCT_DEVICE := device
PRODUCT_MODEL := SDK Add-on For My Device
```

# Add to Existing Target...

## **AndroidProducts.mk**

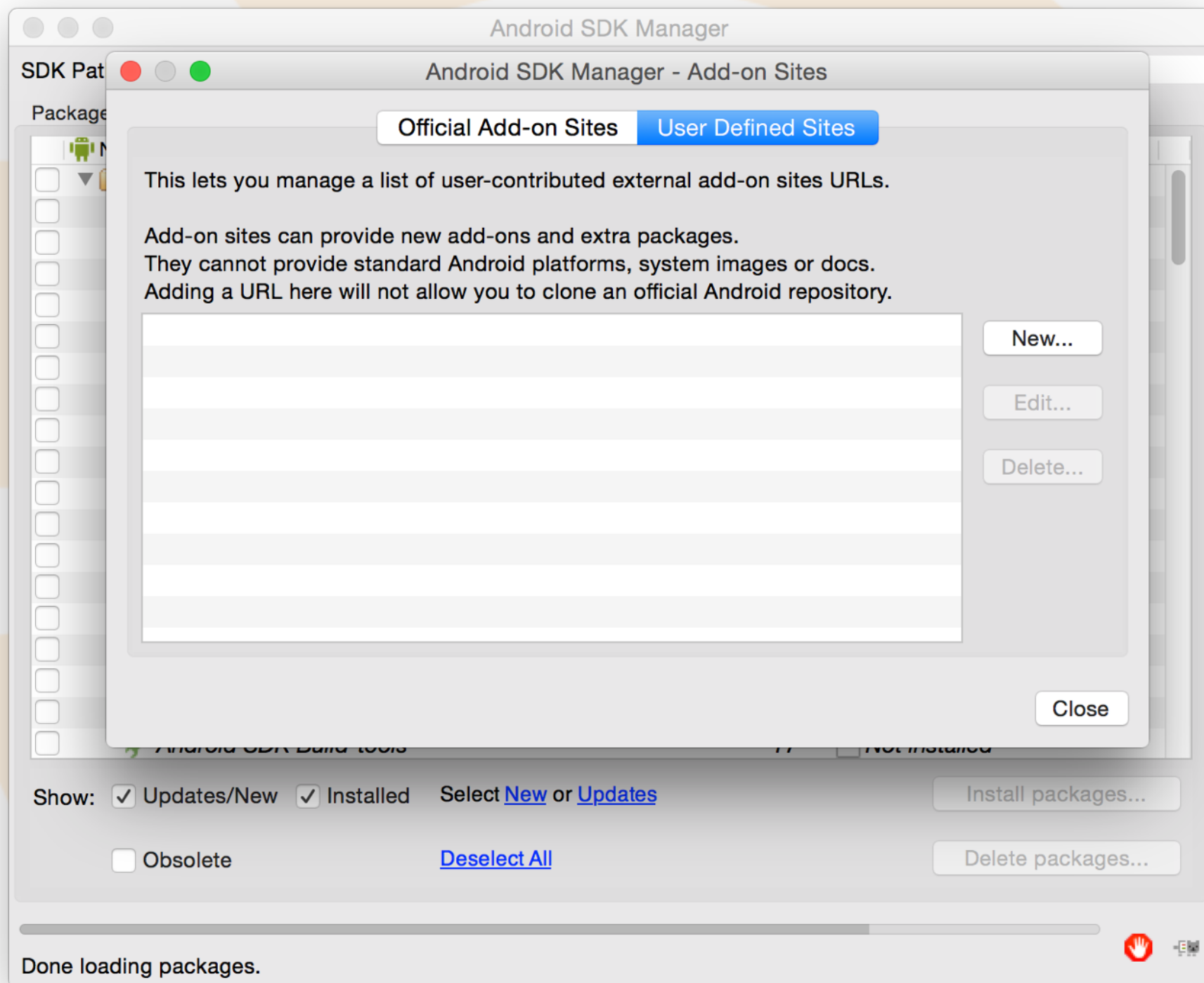
```
# Your existing product makefiles
PRODUCT_MAKEFILES := $(LOCAL_DIR)/full_device.mk

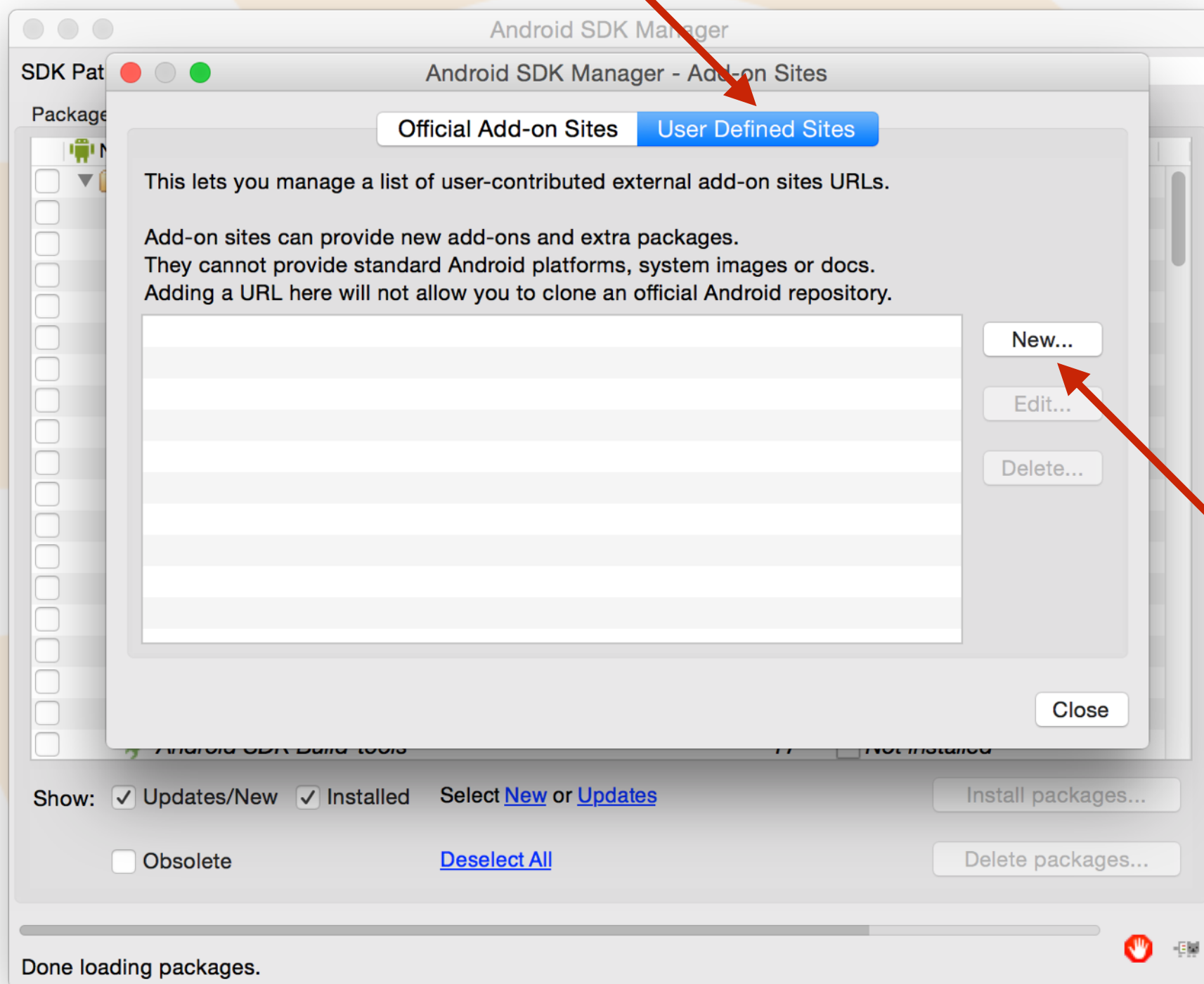
# Append your SDK add-on
PRODUCT_MAKEFILES += $(LOCAL_DIR)/device_sdk_addon.mk
```



```
$ make PRODUCT-device_sdk_addon-sdk_addon
```







# Repositories

```
<sdk:sys-img xmlns:sdk="http://schemas.android.com/sdk/android/sys-img/3"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <sdk:license type="text" id="addon-license"> ... </sdk:license>
  <sdk:system-image>
    <sdk:revision>1</sdk:revision>
    <sdk:description>NewCircle SDK Platform 5.0.1</sdk:description>
    <sdk:api-level>21</sdk:api-level>
    <sdk:abi>x86</sdk:abi>
    <sdk:archives>
      <sdk:archive>
        <sdk:size>187303276</sdk:size>
        <sdk:checksum
          type="sha1">33f9a1d41f16cb6f5b8099752131b8f01d5f53c3
        </sdk:checksum>
        <sdk:url>alpha_sdk_img_r1.zip</sdk:url>
      </sdk:archive>
    </sdk:archives>
    <sdk:uses-license ref="addon-license"/>
    <!-- Link this system image to our add-on library -->
    <sdk:add-on>
      <sdk:vendor-id>newcircle</sdk:vendor-id>
      <sdk:vendor-display>NewCircle</sdk:vendor-display>
    </sdk:add-on>
    <sdk:tag-id>addon</sdk:tag-id>
  </sdk:system-image>
</sdk:sys-img>
```

```
<?xml version="1.0" encoding="utf-8"?>
<sdk:sdk-addon xmlns:sdk="http://schemas.android.com/sdk/android/addon/7"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <sdk:license type="text" id="addon-license"> ... </sdk:license>
  <sdk:add-on>
    <sdk:vendor-id>newcircle</sdk:vendor-id>
    <sdk:vendor-display>NewCircle</sdk:vendor-display>
    <sdk:name-id>addon</sdk:name-id>
    <sdk:name-display>SDK Add-On</sdk:name-display>
    <sdk:api-level>21</sdk:api-level>
    <sdk:revision>1</sdk:revision>
    <sdk:description>NewCircle SDK Add-On</sdk:description>
    <sdk:desc-url>http://thenewcircle.com/</sdk:desc-url>
    <sdk:uses-license ref="addon-license"/>
    <sdk:archives>
      <sdk:archive>
        <sdk:size>104797</sdk:size>
        <sdk:checksum
          type="sha1">7418c038e40bdd82ebc8533183ab9404ad6860ec
        </sdk:checksum>
        <sdk:url>addon_r1.zip</sdk:url>
      </sdk:archive>
    </sdk:archives>
    <!-- Note the extra libraries present in the add-on -->
    <sdk:libs>
      <sdk:lib>
        <sdk:name>com.example.library1</sdk:name>
        <sdk:description>Example Library</sdk:description>
      </sdk:lib>
      <sdk:lib>
        <sdk:name>com.example.library2</sdk:name>
        <sdk:description>Example Service</sdk:description>
      </sdk:lib>
    </sdk:libs>
  </sdk:add-on>
</sdk:sdk-addon>
```



# Tips & Tricks

- Archive SHA: `sha1sum archive.zip | cut -d " " -f 1`
- Archive Size: `stat -c %s archive.zip`
- Repository Schema Files
  - `$AOSP/prebuilts/devtools/repository/*.xsd`
  - `xmllint --schema sdk-addon-07.xsd repository.xml`
- Repository XML Generator Script
  - `$AOSP/development/build/tools/mk_sdk_repo_xml.sh`
  - Parses `manifest.ini` or `source.properties` for metadata

# Learn More

**Device Target + SDK Sample:**  
**<http://github.com/thenewcircle/alpha>**

An

**Android Internals Public Class**  
**San Francisco, June 22-26**  
**<http://thenewcircle.com/training/android>**